

LN-521™ ENABLES DERIVATION, CLONAL CULTURE AND EASY SINGLE-CELL PASSAGE OF HUMAN PLURIPOTENT STEM CELLS WITHOUT ARTIFICIAL INHIBITORS

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Laminins are a group of 16 protein isoforms found in the basement membrane in the extracellular matrix. The natural environment for all stationary cells in the body consists of other similar cells and the basement membrane. Laminins are the only tissue-specific proteins in the basement membrane and therefore critical factors that differentiate one niche from another.

Laminin-521 is one of the first extracellular matrix proteins already expressed by the cells of the inner cell mass in the blastocyst. Our data show that when using LN-521™ to create a niche on cell culture plates, human embryonic stem and induced pluripotent stem (hPS) cells can be cultivated at clonal density and grown indefinitely in a pluripotent state. In addition, LN-521™ support, for the first time, derivation of new human ES cell lines in a chemically defined and xeno-free manner. This is the first xeno-free, defined and biologically relevant matrix that truly supports hPS cells in a clinically relevant, ethical and robust way in cell culture.

LN-521™ also has growth factor like properties and hPS cells cultured on LN-521™ grow twice as fast compared to all other tested matrices. Also due to the biological properties of LN-521™, stem cells cultured on LN-521™ can be split 1:20 or up to 1:30 as single cells without the addition of artificial ROCK inhibitor, which can push genetic variations.

In conclusion, we show that LN-521™ is an optimal matrix for hPS cell culture due to its biological relevance that allows derivation, clonal cultivation and long-term pluripotent cell growth with single-cell passaging without any artificial inhibitors that may modify the cell population.